

ADULT LAMPREY PASSAGE SUCCESS AND BEHAVIOR IN THE LOWER COLUMBIA RIVER, 2008

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ABSTRACT

Monitoring Pacific lamprey (*Lampetra tridentata*) migration behaviors in the Columbia River basin is difficult given their cryptic and photo-negative behaviors and size-related tagging limitations. In 2008, we tagged adult lamprey with half-duplex passive integrated transponder (HD-PIT) tags and/or radio tags and monitored their passage at Bonneville, The Dalles, John Day, McNary, Ice Harbor, and Priest Rapids dams. Our primary objectives for this summary were to estimate lamprey escapement past the monitored sites and to calculate lamprey passage times over a variety of reaches. A secondary objective was to evaluate detection efficiencies for both HD-PIT and radiotelemetry antennas using double-tagged fish.

In total, we radio-tagged 298, HD-PIT tagged 610, and double-tagged 298 lampreys. Lampreys with radio transmitters were significantly larger than those with only HD-PIT tags. Escapement estimates from release below Bonneville Dam to top-of-ladder antennas were 22% for fish with radio tags only, 52% for HD-PIT tagged fish, and 28% for double-tagged fish. Escapement estimates past McNary Dam were 5% for HD-PIT only fish and < 2% for radio- and double-tagged fish. Reach escapement estimates were consistently higher for fish with HD-PIT tags only, both past multiple dams and through dam-to-dam reaches. This result could not be explained by differences in detection efficiency. As in previous years, large lampreys were significantly more likely than small lampreys to pass through most of the monitored reaches. Higher escapement estimates by HD-PIT tagged fish, compared to radio- and double tagged fish, suggest radio-tags negatively affected performance. In general, detection efficiencies were lower for HD-PIT antenna sites than for telemetry antennas. This was expected given the much greater detection range for active radio tags versus passive HD-PIT tags. The HD-PIT and telemetry results provide complimentary data, and the combination provides both fine-scale and system-wide migration information.

Lamprey migration times were highly variable, but tended to be slow at dams (especially Bonneville Dam) and relatively rapid through reservoirs. As examples, median passage times ranged from 5.5–7.6 days from release to past Bonneville Dam, from 16.7–21.4 days from release to past John Day Dam, and from 3.8–5.8 d in the Bonneville-The Dalles and The Dalles-John Day reaches (each included one dam and one reservoir). Lampreys migrated more rapidly as water temperatures increased and river discharge decreased.